

***RV/Endeavor* Deep Water Horizon Response**
Sample Handling, Collection, and
Container/Equipment Decontamination
Procedures

June 2010



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Executive Summary

The purpose of this document is to demonstrate the rigorous sample collection, handling, and decontamination of equipment procedures employed by *RV Endeavor* science personnel. To maintain the integrity of the samples, it was imperative that each sample be collected with clean, decontaminated equipment. Equipment decontamination was performed to prevent contamination of clean areas and cross-contamination of samples as well as to maintain the health and safety of field personnel. Decontamination of all sampling equipment occurred prior to sampling. Decontaminated sampling equipment and sample containers were maintained in a clean, segregated area. Equipment blanks were collected prior to sampling each day. Equipment blanks consisted of pouring deionized water into a randomly selected bottle on the rosette sampler. After ten minutes, water blanks were collected for analysis of TPH and Volatile Organics to ensure that collection bottles were not contaminated.

It is important to note that samples were collected at specified depths using Go Flo bottles on a rosette. The Go-Flo bottles were used to take water samples at determined depths to reduce contamination from surface oil. The Go-Flo bottles were closed when they were lowered into the water and opened automatically at a depth of 10 meters due to hydrostatic pressure. As a result, the pre-cleaned bottles were not contaminated as they are lowered into the water by oil floating on the surface. The package was then raised to just below the surface, without breaking the air-sea interface, and bottles were examined visually to ensure all bottles had opened. It is important to confirm that all bottles had opened because closed bottles may implode if submerged to deep depths. If all bottles had not opened, the package had to be brought back on deck and the decontamination and deployment process was repeated. The package would be then once again be decontaminated by vigorous scrubbing with Dawn, bottles would be cocked in the closed position, and then the package would be deployed again. Again, the bottles would open from hydrostatic pressure at 10 meters and be raised to just below the surface to visually confirm that all bottles have opened. Once it was confirmed that all bottles have opened, the package was deployed and samples were collected at the specified depths. While this process is rigorous and time consuming, it reduces the amount of contamination from surface oil. After sample collection during the up cast, the package was brought to the surface. The surface was sprayed with Dawn to reduce the amount of surface oil as the package breaks the air sea interface. After the package is brought on deck, it is rigorously sprayed and scrubbed with Dawn prior to obtaining samples from the bottles.

Once the package was recovered, VOA (Volatile Organic Analysis) samples were collected first to minimize volatilization from the samples and loss of analytes. Immediately after collecting samples in 40 ml vials for VOA, water samples were collected in 1 L amber jars for analysis of TPH. Samples were then handed to personnel in a “clean” area to tape lids with Teflon tape to reduce elimination of constituents from volatilization, wrap in bubble wrap and refrigerate until sample pick up.

This rigorous collection protocol helped ensure that each sample was collected with clean, decontaminated equipment. Extensive and intensive equipment decontamination and careful handling and collection procedures were required to prevent contamination of clean areas, cross-contamination of samples, and to maintain the health and safety of field personnel.



Figure 1. A hose with Dawn detergent is used to clean the area and equipment



Figure 2. A designated “Hot Zone” and contaminated disposal containment were established to contain oil-contaminated water, prevent contamination of the vessel and to protect the health and safety of personnel.



Figure 3. Equipment rinsate blanks are prepared by pouring laboratory grade deionized water in a randomly selected Go Flo bottle after the equipment has been decontaminated. Blanks are prepared to demonstrate that the equipment decontamination procedures for the sampling equipment were performed effectively. Equipment rinsate blanks will be prepared each day and preferably before each cast.



Figure 4. After 10 minutes, deionized water in GO Flo bottle is collected for VOA (Volatile Organic Analysis).



Figure 5. VOA blanks are collected first to minimize off gassing of volatiles



Figure 6. Blanks are then collected for TPH (Total Petroleum Hydrocarbon) Analysis using amber glass jars



Figure 7. Vials are dried off and taped using Teflon tape or duct tape, wrapped in bubble wrap and immediately refrigerated at 40° C



Figure 8. Jars are dried off, taped using Teflon tape or duct tape, wrapped in bubble wrap and immediately refrigerated at 40° C



Figure 9. The Go-Flo bottles are closed before the package is deployed. Bottles are cocked to maintain a closed position prior to deployment

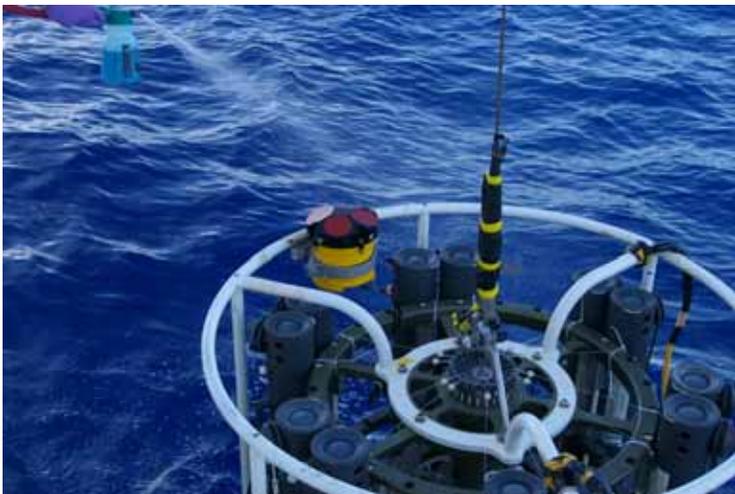


Figure 10. The bottles are closed when package is lowered into the water column. As a result, these bottles are not contaminated by oil at the sea air interface as they are lowered into the water.



Figure 11. During deployment, the CTD rosette package is hosed using Dawn dishwashing detergent and lowered into water.

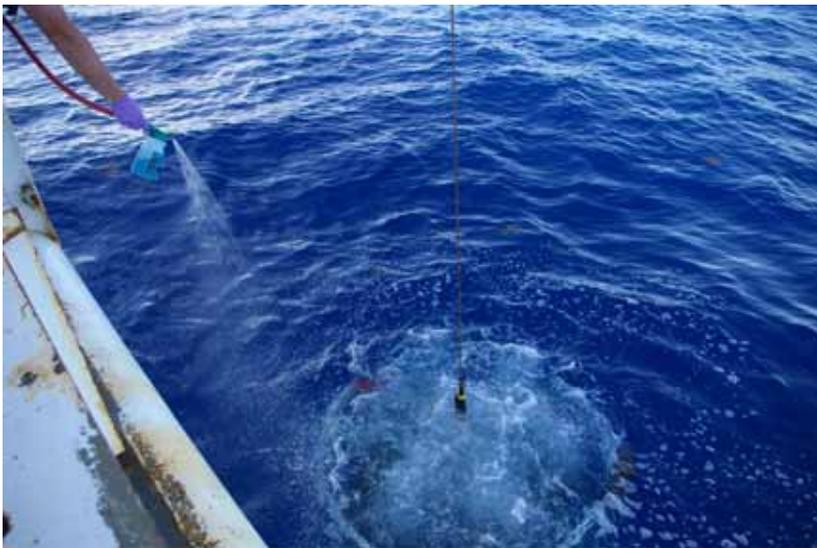


Figure 12. The surface of the water is sprayed with Dawn as CTD is lowered to reduce oil at air sea interface



Figure 13. The water surface is sprayed with Dawn to reduce contamination from oil on the air-sea interface



Figure 14. The bottles open automatically at a depth of about 10 metres due to hydrostatic pressure. Bubbles from the displaced air rise to the surface.



Figure 15. Air bubbles are released when Go-Flo bottles are opened



Figure 16. Package is raised to surface, but does not break the air sea interface, to visually confirm that the bottles opened. Bottles not in open position will implode if hydrostatic release does not occur during cast. If all bottles are not in open position the package must be brought back on deck and the decontamination process and deployment process repeated.



Figure 17. The CTD-Rosette package is then lowered to collect water samples at depths determined by examining sensor data during the down cast.

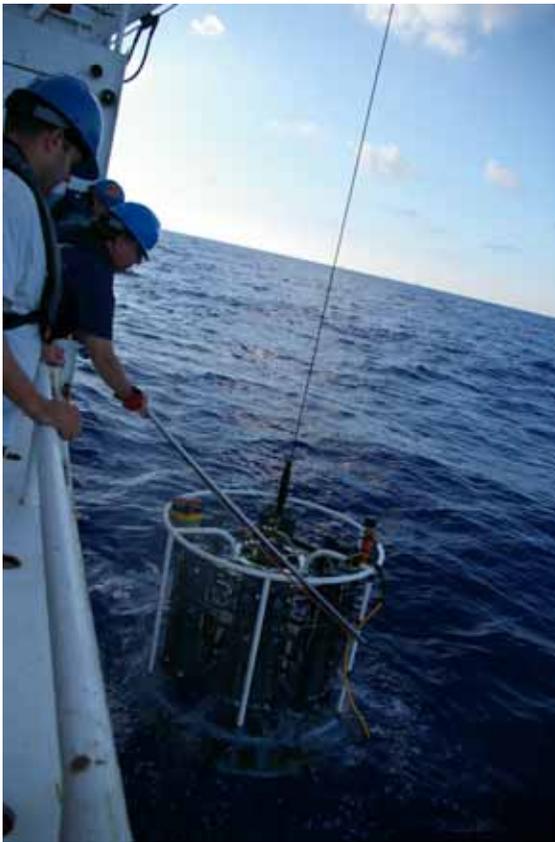


Figure 18. After samples are collected at depths, the package is recovered. As package is raised through air-sea interface, it is sprayed with Dawn to prevent contamination from surface oil.



Figure 19. CTD is lowered on deck



Figure 20. Package is thoroughly rinsed with dawn to remove any oil contamination.



Figure 21. VOA 40 ml vials and 1 L amber jars are staged for sample collection before samples are collected so that samples will be collected efficiently and quickly



Figure 22. Two duplicate VOA vials are filled first and then 1 L amber jars are filled with water sample.



Figure 23. VOA vials are filled with water samples



Figure 24. 1 Liter amber jars are filled with water for analysis of TPH



Figure 25. Samples are handed off to personnel in a clean area. Jars and vials are taped to minimize loss through volatilization, wrapped in bubble wrap and refrigerated until sample pick up.



Figure 26. The package is rigorously scrubbed with dawn, both inside and outside of bottles.